EOS Production Sites
Network Performance Report: February 2013

This is a monthly summary of EOS network performance testing between production sites -- comparing the measured performance against the requirements. Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue.

Highlights:

- **Mostly stable flows**
  - **GPA ⬆ 3.58** (was 3.47 last month).

- **Requirements**: from the Network Requirements Database

- **LaRC ASDC Outflow:** No change: very high congestion continued to reduce performance on most outflows. (Not observed from LaRC ANGe or LaRC-PTH)

- **GES DISC:** Firewall upgraded in February – performance (both incoming and outgoing) stabilized and improved.

- **3 flows below** `Good :`
  - **GSFC → EROS**: `Adequate`
  - **LaRC ASDC → JPL:** `Adequate`
  - **GSFC → Wisconsin:** `Adequate`

Ratings Changes:

Upgrades: ⬆
  - **RSS → GHRC**: `Adequate` → `Good`
  - **LaRC ASDC → JPL:** `Low` → `Adequate`

Downgrades: ⬇ None

Ratings Categories:

Rating	Value	Criteria
Excellent:	**4**	**Total Kbps** > Requirement * 3
Good:	**3**	1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate:	**2**	Requirement < **Total Kbps** < Requirement * 1.3
Almost Adequate:	**1.5**	Requirement / 1.5 < **Total Kbps** < Requirement
Low:	**1**	Requirement / 3 < **Total Kbps** < Requirement / 1.5
Bad:	**0**	**Total Kbps** < Requirement / 3

Where Total Kbps = Average Integrated Kbps (where available), otherwise just iperf

Note that "`Almost Adequate`" implies meeting the requirement excluding the usual 50% contingency factor.

Ratings History:

EOS Production Sites
Ratings History: September 1999 through February 2013
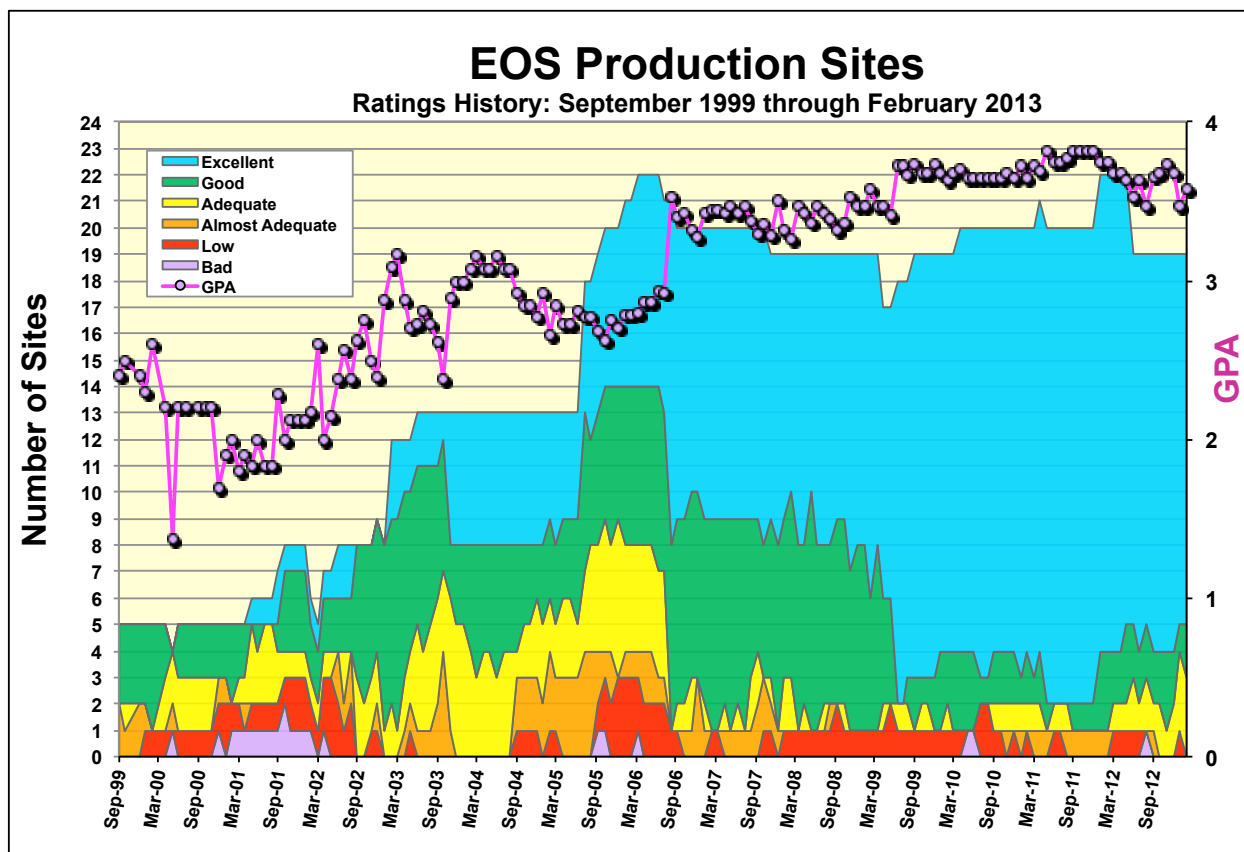
The chart above shows the number of sites in each rating category since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance – they are relative to the EOS requirements.

Additions and deletions:

        2011 April: Added RSS to GHRC
        2011 May: Deleted WSC to ASF for ALOS
        2012 January: Added NOAA → GSFC-SD3E
                        Added GSFC-SD3E → Wisconsin
        2012 June: Deleted GSFC → LASP
                        Deleted GSFC ← → JAXA

Requirements Basis:

In June 2012, the requirements have been switched, as planned for quite a while, to use the EOSDIS network requirements database. ESDIS has been reviewing its network ICD's with each of the instrument teams. These ICDs are now essentially completed, and the database has been updated with the ICD values, so those values are now used here.

Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that in 1.4.3 most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.
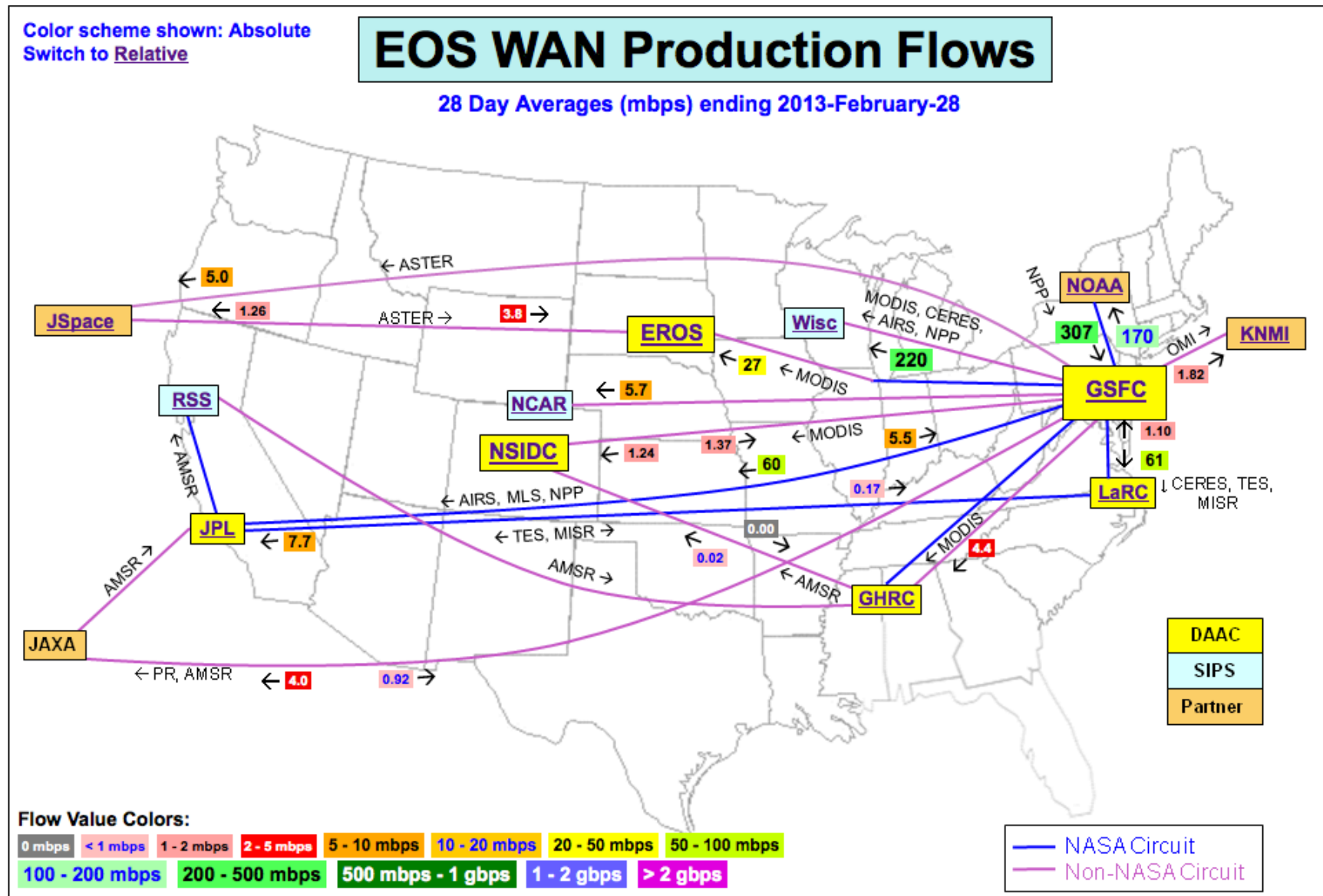
Integrated Charts:

Integrated charts are included with site details, where available. These charts are "Area" charts, with a "salmon" background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility

(JPL, in this example) obtained from routers via "netflow". The green area is stacked on top of the user flow, and represents the "adjusted" daily average iperf thruput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. Adjustments are made to compensate for various systematic effects, and are best considered as an approximation. The red line is the requirement for the flow from the source to destination facilities. On some charts a blue area is also present – usually "behind" the green area – representing adjusted iperf measurements from a second source node at the same facility.

.
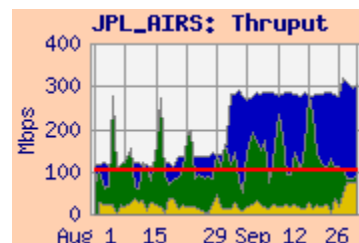
Network Requirements vs. Measured Performance

February 2013		Requirements (mbps)		Testing				Ratings	
Source ➔ Destination	**Instrument (s)**	Current	Old	**Source ➔ Dest Nodes**	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re Database Requirements	
		Database	HB 1.4.3+					This Month	Last Month
GSFC ➔ EROS	MODIS, LandSat	548.4	342.9	MODAPS-PDR ➔ EROS LPDAAC	23.1	578.5	584.5	Adequate	Adq
GSFC ➔ JPL	AIRS, MLS, NPP, ISTs	63	116.7	NPP SD3E OPS2 ➔ JPL-AIRS	48.6	322.7	326.9	Excellent	Ex
JPL ➔ GSFC	MLS	0.57	0.6	JPL-PODAAC ➔ GSFC GES DISC	3.7	69.6	70.0	Excellent	Ex
JPL ➔ RSS	AMSR-E	0.16	0.5	JPL-PODAAC ➔ RSS (Comcast)		9.7		Excellent	Ex
RSS ➔ GHRC	AMSR-E	0.32	0.3	RSS (Comcast) ➔ GHRC		0.78		Good	Adq
LaRC ➔ JPL	TES, MISR	83.5	69.3	LARC-ASDC ➔ JPL-TES	9.0	97.9		Adequate	Low
JPL ➔ LaRC	TES	1.1	1.5	JPL-TES ➔ LARC-PTH	0.25	163.4		Excellent	Ex
GSFC ➔ LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GES EDOS ➔ LaRC ASDC	37.1	783.8	785.0	Excellent	Ex
LaRC ➔ GSFC	MISR	0.6	0.4	LARC-ASDC ➔ GES DISC	0.75	475.8	475.8	Excellent	Ex
JPL ➔ NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC ➔ NSIDC		224.2		Excellent	Ex
NSIDC ➔ GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC ➔ GES DISC	1.50	256.7	256.7	Excellent	Ex
GSFC ➔ NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR ➔ NSIDC-DAAC	9.08	623.5	624.0	Excellent	Ex
GHRC ➔ NSIDC	AMSR-E	0.46	0.5	GHRC ➔ NSIDC DAAC	0.019	10.7		Excellent	Ex
NOAA ➔ GSFC	NPP	522.3	615.6	NOAA-PTH ➔ GSFC NPP-SD3E OPS1	305.1	927.7	993.9	Good	Good
GSFC ➔ Wisc	NPP, MODIS, CERES, AIRS	259.1	253.7	GSFC NPP-SD3E OPS1 ➔ WISC	238.3	306.4	333.1	Adequate	Adq
LaRC ➔ NCAR	MOPITT	0.044	0.1	LaRC-PTH ➔ NCAR		145.7		Excellent	Ex
GSFC ➔ JAXA	TRMM, AMSR-E, MODIS	3.51	0.1	GSFC ➔ JAXA	4.76	Testing discontinued: 31 March 2009		n/a	n/a
JAXA ➔ GSFC	AMSR-E	0.16	0.1	JAXA ➔ GSFC	1.51			n/a	n/a
GSFC ➔ ERSDAC	ASTER	6.75	5.4	GSFC-EDOS ➔ ERSDAC	5.1	222.2	222.5	Excellent	Ex
ERSDAC ➔ EROS	ASTER	8.3	8.3	ERSDAC ➔ EROS PTH	4.2	126.7	126.7	Excellent	Ex
GSFC ➔ KNMI	OMI	13.4	0.03	GSFC-OMISIPS ➔ KNMI ODPS	2.8	241.9	243.8	Excellent	Ex

Significant change from HB v1.4.3 to Requirements Database

Value used for ratings

Ratings Summary		Database Req	
		Score	Prev

*Criteria:			
Excellent	Total Kbps > Requirement * 3	**Excellent**	14	14
Good	1.3 * Requirement <= Total Kbps < Requirement * 3	**Good**	2	1
Adequate	Requirement < Total Kbps < Requirement * 1.3	**Adequate**	3	3
Almost Adequate	Requirement / 1.5 < Total Kbps < Requirement	**Almost Adequate**	0	0
Low	Requirement / 3 < Total Kbps < Requirement / 1.5	**Low**	0	1
Bad	Total Kbps < Requirement / 3	**Bad**	0	0

		Total Sites	19	19

Notes: Flow Requirements include:
TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP

GPA	3.58	3.47

EOS WAN Production Flows

Color scheme shown: Absolute
Switch to Relative

28 Day Averages (mbps) ending 2013-February-28

Flow Value Colors:

0 mbps	< 1 mbps	1 - 2 mbps	2 - 5 mbps	5 - 10 mbps	10 - 20 mbps	20 - 50 mbps	50 - 100 mbps
100 - 200 mbps	200 - 500 mbps	500 mbps - 1 gbps	1 - 2 gbps	> 2 gbps			

—— NASA Circuit
—— Non-NASA Circuit

DAAC
SIPS
Partner

This chart shows the averages for the main EOS production flows for the current month. Up to date flow information can be found at http://ensight.eos.nasa.gov/Weather/web/hourly/Production_Flows-A.shtml

This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement) – it indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 67% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value is used to determine the ratings.
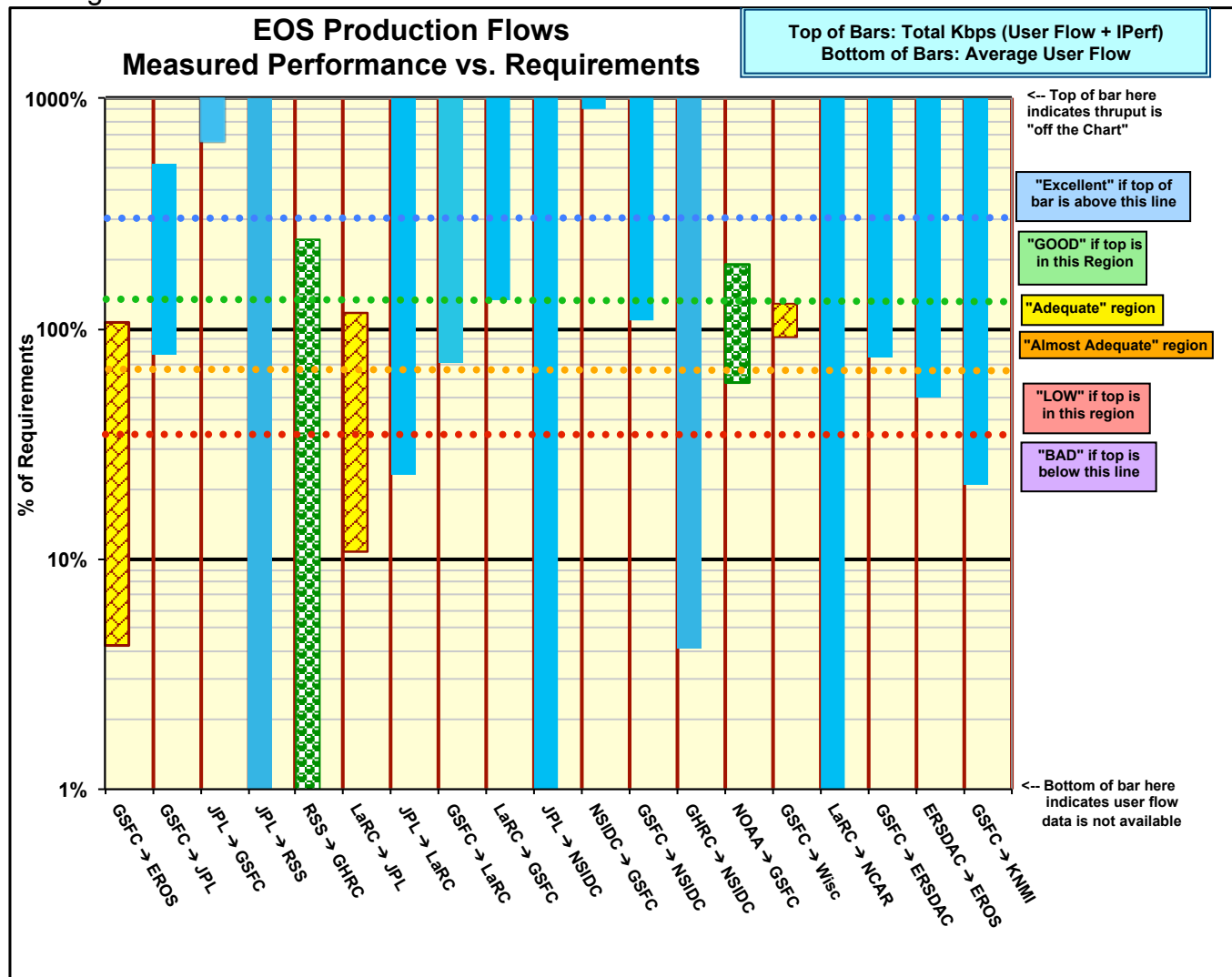
1) EROS:

Ratings: GSFC→ EROS: Continued **Adequate**
ERSDAC→ EROS: Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	**Median**	**Worst**		
MODAPS-PDR→ EROS LPDAAC	744.9	578.5	242.7	23.1	584.5
GSFC-EDOS → EROS LPDAAC	297.7	265.1	47.7		
GES DISC → EROS LPDAAC	298.7	205.4	120.4		
GSFC-ENPL → EROS LPDAAC	1130.6	1127.9	1043.5		
ERSDAC→ EROS LPDAAC	202.8	126.7	34.9	4.2	126.7
NSIDC SIDADS→ EROS PTH	517.8	324.7	132.0		
GSFC-ENPL → EROS PTH	2321.0	2184.4	1839.8		
GSFC-ENPL → EROS PTH (IPv6)	752.4	676.8	578.3		
GSFC-NISN → EROS PTH	826.2	745.4	574.4		
ESDIS-PS → EROS PTH	733.0	581.7	272.0		
ESDIS-PS → EROS PTH (IPv6)	456.8	449.8	408.3		
LaRC PTH→ EROS PTH	179.4	160.3	119.2		
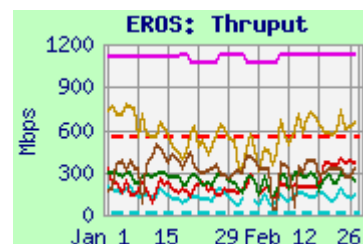
Requirements:

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	CY '12 -	548.4	343	**Adequate**
ERSDAC → EROS	FY '06 –	8.33	8.3	**Excellent**
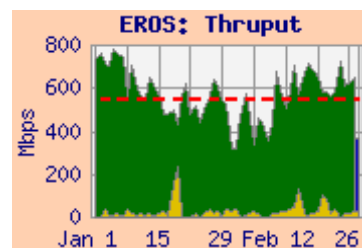
Comments:

1.1 GSFC → EROS: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement, since that is the primary flow. The requirement was increased 60% in June '12, switching to the requirements database, based primarily on increased MODIS reprocessing. As MODIS is not conducting reprocessing at present, the user flow this month is only about 4.2% of the new requirement (a bit less than the 4.8% last month).

The route from MODAPS-PDR is via EBnet to the Doors to NISN SIP, via the NISN 10 gbps backbone to the NISN Chicago CIEF, then via GigE to the StarLight Gigapop, peering there with the EROS OC-48 tail circuit.

The median integrated thruput from MODAPS-PDR to LPDAAC remains above the requirement, with contingency, but by less than 30%, so the rating remains **Adequate** . Thruput also dropped from GES DISC (also on EBnet).

Iperf testing for comparison is performed from GSFC-ENPL to both LPDAAC (now to the "FTL" node outside the EROS firewall) and to EROS-PTH (a 10 gig host) using both IPv4 and IPv6. The GSFC-ENPL host has a direct 10 gig connection to the MAX; its route is via MAX to Internet2 to StarLight in Chicago. GSFC-ENPL to EROS-PTH (IPv4) now typically gets over 2 gbps. This result shows that the capacity of the network is in excess of the requirement – it would be rated **Excellent** . IPv6 tests appear limited below 1 gbps.
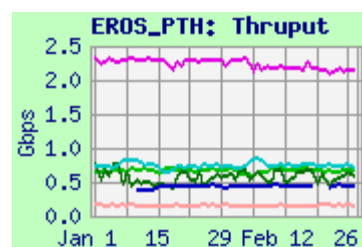
1.2 ERSD → EROS: Excellent . See section 9 (ERSD) for further discussion.

1.3 NSIDC → EROS-PTH: Performance has been noisy but stable since September.

1.4 LaRC → EROS: The thruput from LaRC-PTH to EROS-PTH was very stable. The route is via NISN SIP to the Chicago CIEF to StarLight – similar to EBnet sources. Note that LaRC-PTH outflow is limited to 200 mbps by NISN at LaRC.

2) to GSFC
2.1) to GES DISC

Ratings: NOAA → NPP SD3E: Continued **Good**
NSIDC → GES DISC: Continued **Excellent**
LDAAC → GES DISC: Continued **Excellent**
JPL → GSFC: Continued **Excellent**

Web Pages:

http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml
http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml
http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtml
http://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	**Median**	**Worst**		
NOAA-PTH → NPP-SD3E-OPS1	938.9	927.7	895.6	305.1	993.9
EROS LPDAAC → GES DISC	215.1	173.2	39.5		
EROS PTH→ GSFC-ESDIS PTH	617.8	452.8	247.0		
JPL-PTH→ GSFC-ESDIS PTH	92.2	92.2	92.0	2.9	
JPL-TES→ GSFC-NISN	527.0	326.1	134.6		
LaRC ASDC → GES DISC	586.6	475.8	285.4	0.75	
LARC-ANGe → GSFC-ESDIS PTH	544.9	539.5	532.1		
NSIDC DAAC → GES DISC	327.5	256.7	146.6	1.5	
NSIDC DAAC → GSFC-ISIPS (scp)	75.1	73.7	55.7		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
NSIDC → GSFC	CY '12 –	0.017	0.6	**Excellent**
LaRC ASDC → GES DISC	CY '12 –	0.6	0.4	**Excellent**
JPL→ GSFC combined	CY '12 –	0.57	3.2	**Excellent**
NOAA → NPP SD3E	CY '12 –	522.3	615.6	**Good**

Comments: **The GES DISC firewall was upgraded on 14 February.** But incoming tests were blocked until 19 February. The GES DISC test node window size was increased, also on 19 February. **These changes resulted in a significant improvement in thruput, both incoming and outgoing** (but unfortunately, too late in the month to dominate the median measurements above).

NOAA → NPP-SD3E: Performance from NOAA-PTH to GSFC NPP-SD3E-OPS1 was very steady at over 900 mbps, limited by the gig-E interfaces on the test machines (the circuits are all 10 gbps). User flow was similar to last month, and close to the requirements (without contingency).

EROS LPDAAC, EROS-PTH → GSFC: The thruput for tests from EROS and EROS-PTH to GES DISC and ESDIS-PTH were stable.

JPL → GSFC: Thruput from JPL-PTH improved with the GES DISC firewall upgrade this month, limited by the Fast-E interface on JPL-PTH. With the modest requirement the rating remains **Excellent** . The actual user flow is close to the old requirement, but well above the new reduced requirement. Testing from JPL-TES to GSFC-NISN (not graphed) more clearly shows the capability of the network. Note that some JPL → GSFC flows take Internet2 instead of NISN, based on JPL routing policies.

LaRC → GSFC: Performance from LaRC ASDC to GES DISC was again variable, apparently due to congestion at ASDC, but it did improve with the GES DISC firewall upgrade this month. Thruput from LaRC ANGe to ESDIS-PTH was much more stable. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent** . The user flow this month was a bit higher than the requirement.
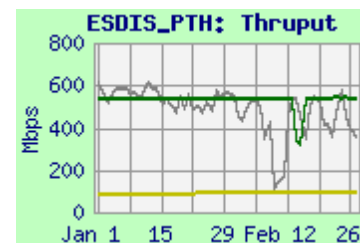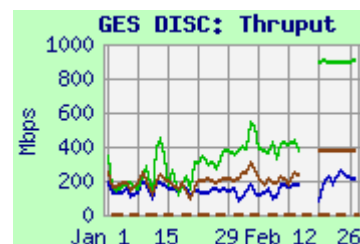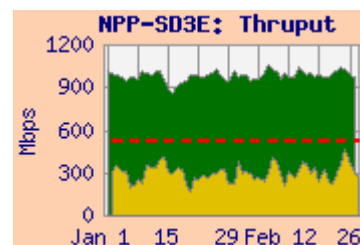
NSIDC → GSFC: Performance from NSIDC to GES DISC improved with the GES DISC firewall upgrade this month, and way above the tiny requirement; the rating remains **Excellent.** The user flow was again above the old requirement, and well above the new lower requirement. Thruput to GSFC-ISIPS using SCP (iperf testing still down after reconfiguration due to firewall blocking) is lower than iperf previously, as expected, but is well above the requirement.
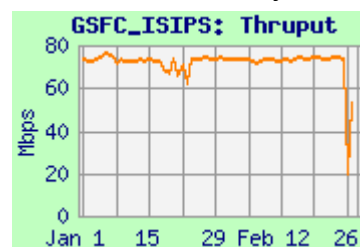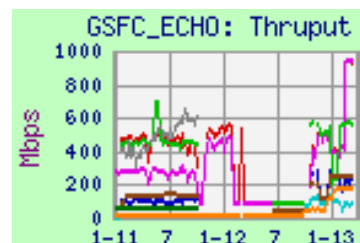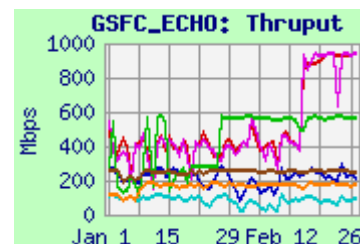
2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page:
http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	286.3	210.3	56.8
EROS LPDAAC ftp	145.5	80.5	7.9
GES DISC	890.4	691.1	543.2
GES DISC ftp	935.7	597.3	375.6
LaRC ASDC DAAC	585.7	563.8	469.9
LaRC ASDC DAAC ftp	n/a	n/a	n/a
NSIDC DAAC	261.1	254.0	213.2
NSIDC DAAC ftp	212.2	175.1	72.8

Comments:

Performance improved dramatically from all sources in mid October, when the ECHO firewall was replaced. Performance improved again from EROS and NSIDC in mid-December with retuning, and from GES DISC in March with the firewall upgrade. FTP performance is mostly limited by TCP window size – especially from sites with long RTT.

2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_EMS.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	271.7	204.8	44.0
ESDIS-PTH	937.8	924.9	722.6
GES DISC	683.8	592.5	337.5
LARC ASDC	530.1	504.5	293.0
MODAPS-PDR	938.0	931.8	455.8
NSIDC-SIDADS	303.9	295.1	247.7
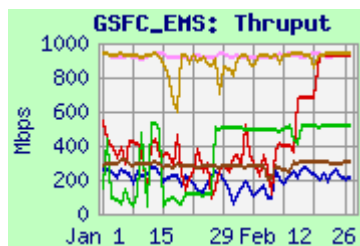
Comments:

Testing is performed to GSFC-EMS from the above nodes, iperf only. The testing was transitioned to the new EMS test node (FS1) between November '11, and January '12 with much improved thruput. The performance limitation to the old server was its 100 mbps Fast-E connection; the new server is gigabit connected.

Performance stabilized this month at the higher level from LaRC ASDC, and improved from GES DISC with its firewall upgrade; thruput from other sources was pretty stable.
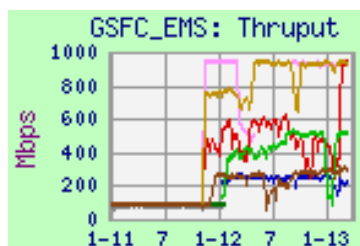
3) JPL:
3.1) GSFC → JPL: Ratings: GSFC → JPL: Continued **Excellent**

Web Pages: http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml
http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml
http://ensight.eos.nasa.gov/Missions/NPP/JPL_SOUNDER.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-GES DISC→ JPL-AIRS	247.6	178.9	119.8	48.6	196.7
NPP-SD3E-OPS2→ JPL-AIRS	331.8	322.7	269.0		
GSFC-NISN → JPL-AIRS	293.5	275.2	176.2		
ESDIS-PTH → JPL-AIRS	295.7	249.6	222.2		
NPP IDPS-Mini → JPL-Sounder	105.3	86.1	55.6		
GSFC-NISN → JPL-MLS	384.8	337.7	160.3		
ESDIS-PTH → JPL-MLS	273.9	257.9	166.8		
ESDIS-PTH → JPL-PODAAC	120.8	101.3	77.1		
GSFC-NISN → JPL- PODAAC	164.0	128.3	63.7		
MODAPS-PDR → JPL-PODAAC	84.3	60.7	36.8		
GSFC-NISN → JPL-QSCAT	83.4	80.0	63.7		
ESDIS-PS → JPL-QSCAT	88.4	86.5	65.4		
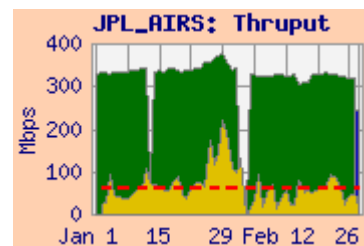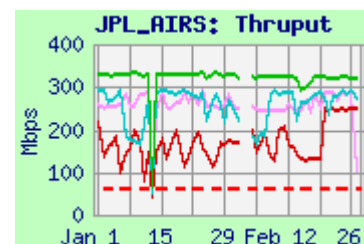
Requirements:

| Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	CY '12-	**63**	**116.7**	**Excellent**
GSFC → JPL AIRS	CY '12-	40	98	**Excellent**
GSFC NPP → JPL Sounder	CY '12-	15	15	**Excellent**
GSFC → JPL MLS	CY '12-	1.0	2.1	**Excellent**

Comments: Thruput from EBnet sources (GES DISC, NPP-SD3E, ESDIS-PS, and ESDIS-PTH) **increased greatly in September '12,** with the EBnet firewall upgrade (due to EBnet reduced outgoing packet loss), compared with GSFC-NISN, which was more stable. Thruput from GSFC-NISN improved to JPL destinations in early December.

AIRS , Overall: The requirements were switched in June '12 to use the requirements database, instead of the Handbook v1.4.3 previously. This resulted in a 46% decrease in the overall requirement.

The AIRS Integrated thruput from **GES DISC** improved with the firewall upgrade this month, but with lower user flow than the last half of January; thruput remains above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent** .

The **JPL overall rating** is based on the **NPP-SD3E-OPS2** to JPL AIRS thruput, compared with the sum of all the GSFC to JPL requirements. The median thruput remained above 3 x this requirement, so the overall rating remains **Excellent** . **Note that the average user flow this month was above the requirement (including contingency).**

NPP to JPL Sounder: Thruput from **NPP IDPS-Mini** to the JPL Sounder PEATE was mostly stable after improving in September due to reduced EBnet packet loss. The rating remains **Excellent** .
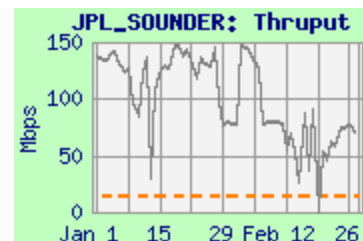
3.1) GSFC → JPL: continued

MLS: Thruput from ESDIS-PTH improved in September due to reduced EBnet packet loss. Thruput from GSFC-NISN dropped at the same time, but improved back to previous levels in December. Both were way above the modest requirement, so the rating remains **Excellent** .

PODAAC: There is no longer a requirement from GSFC to JPL PODAAC in the database. But performance to PODAAC improved in September due to reduced EBnet packet loss – thruput was way above the previous 1.5 mbps PODAAC requirement.

QSCAT: There is no longer a requirement from GSFC to JPL QSCAT in the database. Thuput from ESDIS-PS to QSCAT also improved in September due to reduced EBnet packet loss (unlike from GSFC-NISN, which was stable). It remains well above the modest previous 0.6 mbps requirement.
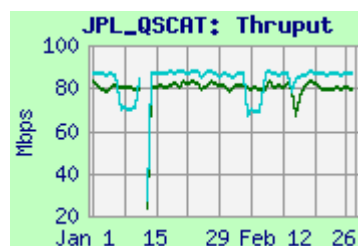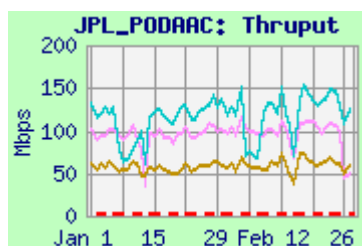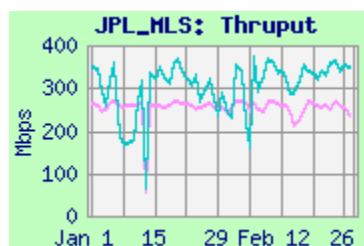
3.2) JPL → LaRC   Rating: Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	**Median**	**Worst**	**User Flow**
JPL-PTH → LaRC PTH	88.9	88.8	88.4	0.25
JPL-TES → LaRC PTH	324.2	163.4	78.2	

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL → LaRC	CY '12 –	1.1	1.5	**Excellent**
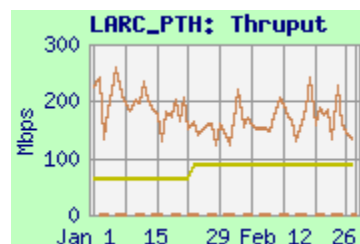
Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. This month the thruput from JPL-TES was again noisy but remained much higher than the requirement; the rating remains **Excellent** . The user flow this month was below the usual and the requirement.

Thruput from JPL-PTH to LaRC-PTH switched from the lower of its two common states (60 mbps), to the higher state (88 mbps) in mid January. It is limited by a Fast–E interface on JPL-PTH.

3.3) LaRC → JPL

Rating: ↑ **Low** → **Adequate**

Web Pages:

http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtml
http://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
LaRC ASDC → JPL-MISR	82.7	79.5	53.3	0.96	79.5
LaRC PTH → JPL-MISR	78.8	75.3	59.3		
LaRC ASDC → JPL-TES	102.7	97.9	57.8	0.04	
LaRC PTH → JPL-TES	175.4	167.6	137.4		
LaRC PTH → JPL-TES sftp	26.6	25.8	11.9		
LaRC ANGE → JPL-PTH	85.0	82.8	75.0	9.0	

Requirements:

| Source → Dest	Date	Mbps	Prev	Rating
LaRC → JPL-Combined	CY '12 –	83.5	69.3	**Adequate**
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	**Adequate**
LaRC ASDC → JPL-TES	CY '12 –	5.5	7.0	**Excellent**

Note: Performance from **LaRC ASDC** to JPL (also from **LaRC ASDC** to most other destinations) was very variable (typically on a 3 hour cycle), beginning at the end of April 2012, apparently due to congestion at ASDC. After mid July, the 3 hour cycle disappeared, but the thruput from **LaRC ASDC** stayed low and noisy – then stabilized in late January 2013. **Performance from LaRC ANGe and LaRC PTH to JPL was stable and did not exhibit this characteristic.**

LaRC → JPL (MISR): **LaRC ASDC** to JPL MISR thruput is limited by the Fast-E connection to the MISR node, and the ASDC congestion. User flow was much lower than the requirement. The median integrated thruput is back above the MISR requirement, so the MISR rating improves to **Adequate** .

LaRC→ JPL (Overall, TES): Median performance from LaRC ASDC DAAC to JPL-TES dropped way down at the end of April 2012, due to the congestion above. The median thruput remained well over 3 x the TES requirement, so the TES rating remains **Excellent** . Thruput stabilized in late January, and is now slightly above the combined requirements, so the Overall rating improves to **Adequate** .   User flow to TES is very low.

The JPL-PTH integrated graph shows the overall LaRC to JPL user flow (vs. the overall requirement). The true capacity of the network is better seen with the LaRC PTH → JPL-TES thruput, which is not subject to the ASDC congestion (but is limited to 200 mbps by NISN). The Overall rating based on this test would be **Good** .

An additional test, from **LaRC ANGe** to JPL-TES, will be added next month. This test is expected to have the best LaRC to JPL performance.
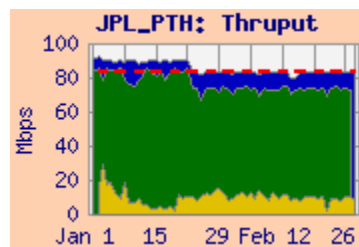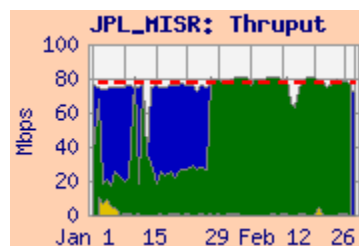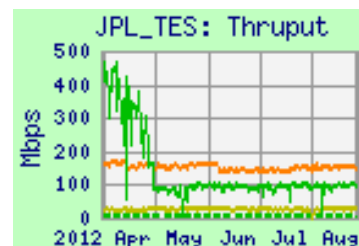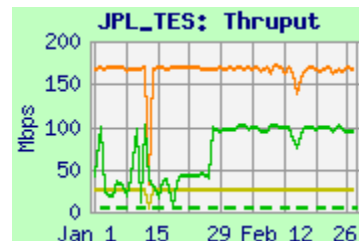
4) GSFC → LaRC: **Rating: Continued Excellent**

Web Pages : http ://ensight.eos.nasa.gov/Organizations/production/LARC.shtml
            http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
            http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	**Median**	**Worst**	**User Flow**	**Integrated**
GES DISC → LaRC ASDC	920.1	713.6	371.5	37.1	713.6
GSFC-EDOS → LaRC ASDC	864.0	783.8	120.8		
ESDIS-PTH → LaRC-ANGe	476.7	475.1	459.5		
GSFC-NISN → LaRC-ANGe	497.9	495.7	485.6		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	52.2	31.3	**Excellent**

Comments: Thruput from all EBnet sources (GES DISC, EDOS, and ESDIS-PTH) improved in September '12 due to reduced EBnet packet loss. Note that the high packet loss prior to September did not have much effect on thruput for these flows – TCP recovers quickly due to the short RTT.

GSFC → LaRC ASDC: Thruput from GES DISC to LaRC ASDC DAAC improved in mid February with the GES DISC firewall upgrade. It remained well above 3 x the increased combined requirement, so the rating remains **Excellent** . Thruput to ASDC from GSFC-EDOS was noisy but stable.

As seen on the integrated graph, the user flow was close to normal and the requirement this month, after being above normal (79 mbps) last month.

 ANGe (LaTIS): Testing to ANGe ("Bob") from ESDIS-PTH improved in September due to reduced EBnet packet loss, and was similar to performance from GSFC-NISN.
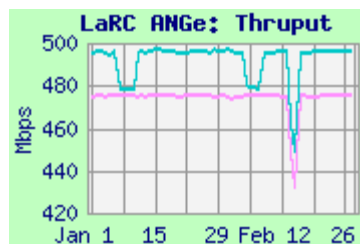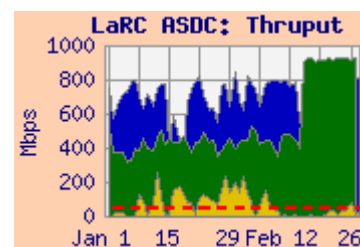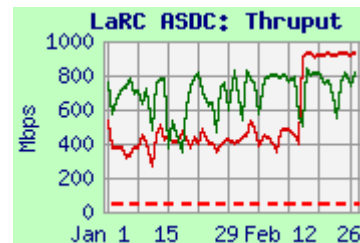
5) Boulder CO sites:
5.1) NSIDC:

Ratings: GSFC → NSIDC: Continued **Excellent**
JPL → NSIDC: Continued **Excellent**
GHRC → NSIDC: Continued **Excellent**

Web Pages: http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

Test Results: **NSIDC S4PA**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → NSIDC DAAC	628.5	623.5	407.9	9.1	624.0
GES-DISC → NSIDC DAAC	206.0	157.8	87.1		
GSFC-EDOS → NSIDC DAAC	159.1	157.7	17.6		
ESDIS-PTH → NSIDC DAAC	607.9	606.6	573.6		
GSFC-ISIPS → NSIDC (iperf)	137.3	135.6	127.4		
JPL PODAAC → NSIDC DAAC	243.1	224.2	178.9		
GHRC → NSIDC DAAC (nuttcp)	22.8	10.7	3.5		
GHRC → NSIDC DAAC (ftp pull)	49.3	24.8	2.1		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	CY '12 –	8.42	27.6	**Excellent**
JPL → NSIDC	CY '12 –	0.16	0.2	**Excellent**
GHRC → NSIDC	CY '12 –	0.46	0.5	**Excellent**

Comments: GSFC → NSIDC S4PA: Thruput from all EBnet sources (MODAPS-PDR, GES DISC, GSFC-EDOS, ESDIS-PTH, and GSFC-ISIPS) improved in September due to reduced EBnet packet loss. Thruput had dropped from GSFC-EDOS and MODAPS-PDR at the end of May, but remained stable at that time from GES DISC, ESDIS-PTH and GSFC-ISIPS. Thruput from GES DISC dropped in August, corresponding with an address change for GES DISC (but recovered in September). Thruput from GES DISC improved again in mid February with the GES DISC firewall upgrade, and subsequent retuning.

The rating is based on testing from the MODAPS-PDR server to the NSIDC DAAC. The requirement was reduced in May '09 from 34.5 mbps (and was 64 mbps in April '08). The integrated thruput from MODAPS-PDR remains more than 3 x the requirement, so the rating remains **Excellent**. The 9.1 mbps average user flow was way above typical, and ABOVE the reduced requirement.

JPL PODAAC → NSIDC S4PA: The requirement was reduced from 1.34 mbps in May '09. Thruput from PODAAC to NSIDC improved dramatically in mid December, and has been stable since then; the rating remains **Excellent**.

GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. The median thruput remained well above 3x the 0.46 mbps requirement, so the rating remains **Excellent**. User flow averaged only 19 kbps this month, well below the requirement. FTP testing had stopped in December due to filename changes, but resumed in February.
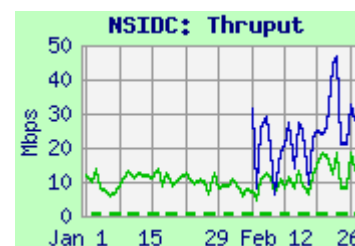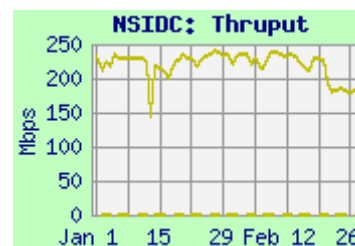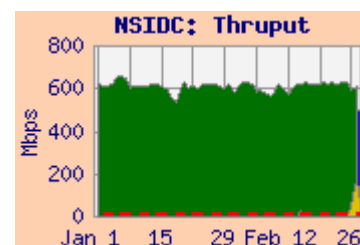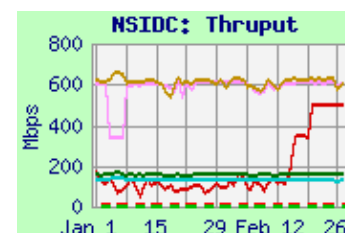
5) Boulder CO sites (Continued):
5.1) NSIDC: (Continued):

Test Results: NSIDC SIDADS, NSIDC-PTH

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	188.0	161.4	111.1
GSFC-NISN → NSIDC-SIDADS	271.9	270.5	219.7
ESDIS-PTH → NSIDC-PTH	333.5	257.4	198.2
MODAPS-PDR → NSIDC-PTH	252.8	183.7	153.6
JPL PTH → NSIDC-PTH	89.1	89.0	82.5

GSFC → NSIDC-SIDADS: The performance to SIDADS was pretty stable via both NISN and Internet2 (note expanded scale on graph).

NSIDC-PTH: Thruput from all sources was mostly stable this month. Testing had gone down to NSIDC-PTH in mid December, but recovered in early January.
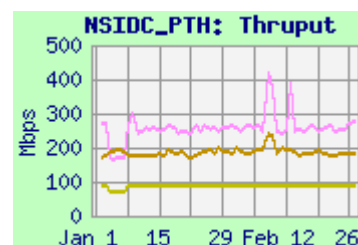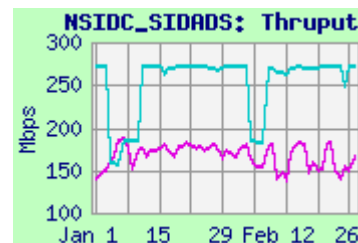
5.2) LASP: Ratings: LASP → GSFC: Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.75	3.71	3.51
ESDIS-PTH → LASP blue (iperf)	9.29	9.27	8.30
GES DISC → LASP blue (iperf)	6.96	6.95	5.16
LASP → GES DISC	9.33	9.32	8.94

Requirement:

Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	**Excellent**

Comments: In January '11, LASP's connection to NISN PIP was rerouted: it previously was 100 mbps from CU-ITS via NSIDC; this was changed to a 10 mbps connection to the NISN POP in Denver.

Iperf testing from GES DISC improved and stabilized in mid February, with the GES DISC firewall upgrade. Iperf and SCP testing from ESDIS-PTH was very stable, and consistent with the circuit limitation. Return testing from LASP to GES DISC was also stable, rating **Excellent** .
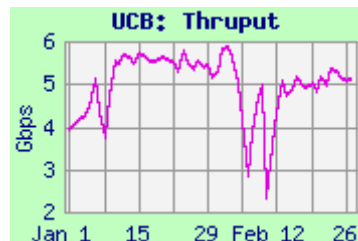

5.3) UCB:

Web Page   http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml
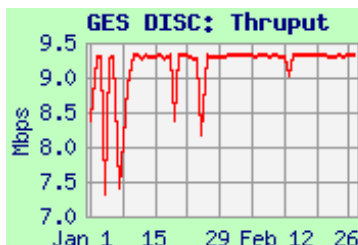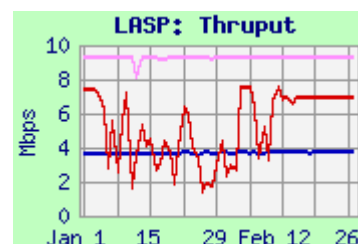
Test Results:

Source	Medians of daily tests (gbps)		
	Best	Median	Worst
GSFC-ENPL-10G	5.7	5.0	3.8

Comments: Testing is to a 10 gig connected test node at UCB. The route is via Internet2 to FRGP, similar to NCAR. Performance stabilized and improved in January.

5.4) NCAR:

Ratings: LaRC → NCAR: Continued **Excellent**
GSFC → NCAR: Continued **Excellent**

Web Pages   http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
LaRC PTH	174.0	145.7	82.9
GSFC-ENPL-10G	5183.4	2613.1	454.1
GSFC-ENPL-FE	98.7	98.1	93.8
GSFC-NISN	708.7	488.2	300.7

Requirement:

| Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	**Excellent**
GSFC	CY '12 -	0.111	5.0	**Excellent**

Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Testing was switched to NCAR's PerfSonar server in March '12 – testing was discontinued from LaRC ASDC at that time; testing from LaRC-PTH continued. This node is 10 gigabit capable. Performance from most nodes was similar to the previous test node, but somewhat noisier.

From LaRC: Thruput from LaRC-PTH was well above 3 x the modest requirement, so the rating remains **Excellent**. Note that outflow from LaRC-PTH is limited to 200 mbps by NISN.

From GSFC: From GSFC-NISN, the route is via NISN to the MAX (similar route as from LaRC-PTH). Thruput improved substantially in December. It remained noisy but stable, and well above 3 x the requirement, so the rating remains **Excellent**. **The average user flow from GSFC this month was 4.6 mbps, much higher than usual and the requirement.**

From GSFC-ENPL-10G, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node is noisy, but gets over 5 gbps on peaks.
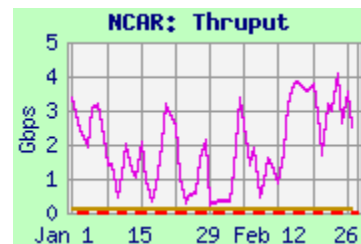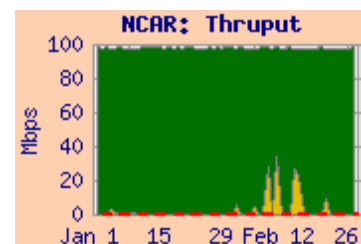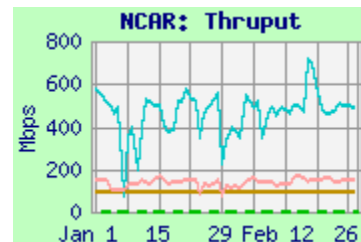
6) Remote Sensing Systems (RSS):   Ratings: **JPL → RSS:** Continued **Excellent**
RSS → GHRC: ↑ Adequate → Good

Web Page   http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
JPL PODAAC → RSS (Comcast)	23.4	9.7	4.4
JPL TES → RSS (Comcast)	22.6	11.2	4.4
GSFC-NISN → RSS (Comcast)	45.0	41.0	34.2
GHRC-UAH → RSS (Comcast)	37.7	16.7	1.2
GHRC-NISN→ RSS (Comcast)	19.5	6.0	2.0
RSS (Comcast) → GHRC (UAH)	2.58	0.71	0.31
RSS (Comcast) → GHRC (NISN)	2.53	0.78	0.30

RSS: Thruput
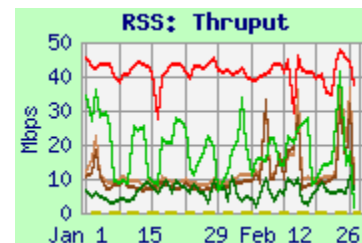
Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL PODAAC → RSS	CY '12 -	0.16	0.49	**Excellent**
RSS → GHRC	CY '12 -	0.32	0.34	**Good**

Comments: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving L1 data from JAXA via JPL, and sending its processed L2 results to GHRC (aka NSSTC) (UAH, Huntsville, AL).

At the end of March '12, RSS switched its production node from the NISN SIP circuit (4 x T1s to NASA ARC -- total 6 mbps) to the Comcast circuit, rated at 50 mbps incoming, and 12 mbps outgoing (installed in April 2011). Testing via the NISN circuit to RSS was discontinued at that time.

It appears that the peering between JPL and Comcast recovered in early February -- it had degraded at the end of December. The route from JPL is via Los Nettos, CENIC, peering with Comcast in LA.

Testing from the UAH server at GHRC was stable; it had also degraded at the end of December. Testing from the NISN server at GHRC has been noisy but long-term stable since April '12, at a lower level than via UAH.

The median iperf from JPL remained well above 3 x the reduced requirement, so the rating from JPL remains **Excellent**.

RSS → GHRC: The servers at RSS on the Comcast circuit allow "3rd party" testing, as does the server at GHRC. Testing is therefore performed between RSS and GHRC, both with a UAH address and a NISN address at GHRC.

GHRC: Thruput

The results to the two destinations are very similar; both dropped severely in early January, but recovered to their previous noisy state in early February. The performance to the NISN address remains above the requirement, now by more than 30%, so the rating improves to **Good**.
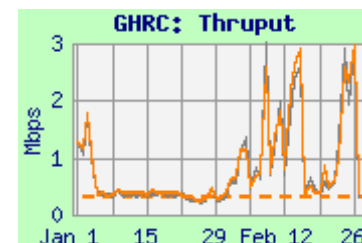
7) Wisconsin:

Rating: Continued **Adequate**

Web Pages   http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml

Test Results:

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	**Median**	**Worst**		
NPP-SD3E	308.9	306.4	301.9	238.3	333.1
GES DISC	279.7	268.4	221.1		
GSFC ENPL	319.2	295.1	244.4		
LaRC ANGe	203.0	198.8	131.0		

Requirements:

Source Node	Date	mbps	Prev	Rating
NPP-SD3E	CY'12 -	237.2	237.2	**Good**
GSFC MODAPS	CY'12 -	21.9	16.5	**Excellent**
GSFC Combined	CY'12 -	259.1	253.7	**Adequate**
LaRC Combined	CY'12 -	n/a	7.9	**Excellent**

Comments: The University of Wisconsin is included in this Production report due to its function as Atmosphere PEATE for NPP. Wisconsin continues to be an SCF on the MODIS, CERES and AIRS teams.

GSFC: Thruput from NPP-SD3E (on EBnet) was stable this month. User flow was a bit higher than previously. The integrated thruput was above the NPP requirement by more than 30%, so the NPP rating is **Good** .   It was also above the GSFC combined requirement, but by slightly less than 30%, so that rating remains **Adequate** .

Thruput from GES DISC, however, improved in mid February, due to the GES DISC firewall upgrade. Thruput from all EBnet sources had improved in September 2012 due to the EBnet firewall replacement (Thruput from EBnet previously had dropped in February '12 due to EBnet outgoing packet loss).

The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

From GSFC-ENPL thruput was similar, and had been unaffected by the EBnet packet loss. In late September, testing from GSFC-ENPL was switched to a PerfSonar node at Wisconsin, with much higher thruput, but this dropped in October.

LaRC: Although there is no longer a CERES requirement from LaRC to Wisconsin, thruput from LaRC ANGe is pretty steady and well above the previous 7.9 mbps requirement, and would be rated **Excellent** . The route from LaRC is via NISN, peering with MREN in Chicago. Testing from LaRC was switched in November due to the old test node at LaRC being retired.
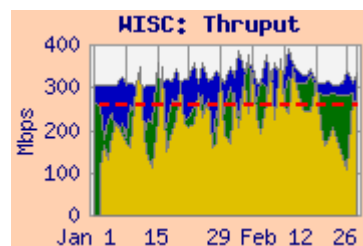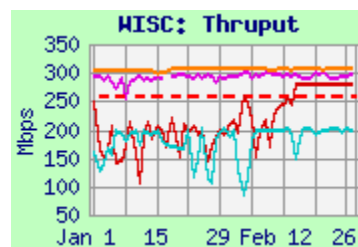
8) KNMI: Rating: Continued **Excellent**

Web Pages   http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml
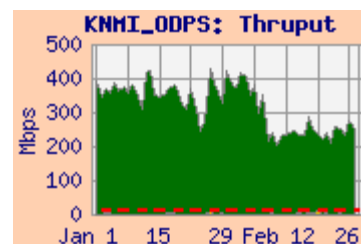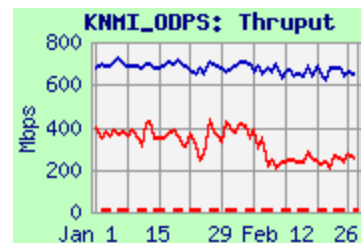
Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	**Median**	**Worst**	**Reqmt**
OMISIPS → KNMI-ODPS	530.1	241.9	131.6	13.4
GSFC-ENPL → KNMI-ODPS	788.6	662.5	474.1	

Comments: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 2 x 10 gbps circuit to Frankfurt, then via Surfnet through Amsterdam.

The requirement was increased with the use of the database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

The rating is based on the results from OMISIPS at GSFC to the ODPS primary server at KNMI. Thruput from OMISIPS (on EBnet) has been mostly stable since it improved in mid September due to the EBnet firewall replacement! The median thruput remains much more than 3 x the increased requirement, so the rating remains **Excellent**.

The user flow, however, averaged only 2.8 mbps this month, similar to the last 3 months (and close to the typical 4 mbps), but well below the requirement.

19

9) JSpace - ERSD:

Ratings: **GSFC → ERSD:** Continued **Excellent**
ERSD → EROS: Continued **Excellent**
ERSD → JPL-ASTER-IST: N/A

Web Page: http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml

US ←→ JSpace - ERSD Test Results

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → ERSD	478.1	222.2	8.1	5.1	222.5
GES DISC → ERSD	54.0	44.1	30.0		
GSFC ENPL (FE) → ERSD	92.4	92.0	91.5		
GSFC ENPL (GE) → ERSD	621.3	483.9	221.0		
ERSD → EROS	202.8	126.7	34.9	4.2	126.7
ERSD → JPL-ASTER IST	n/a	n/a	n/a		
ERSD → JPL-TES	182.1	108.8	50.7		

Requirements:

Source → Dest	CY	Mbps	Prev	Rating
GSFC → ERSD	'12 -	6.75	5.4	**Excellent**
ERSD→ JPL-ASTER IST	'12 -	0.31	0.31	**Excellent**
ERSD→ EROS	'12 -	8.33	8.3	**Excellent**

Comments:

GSFC → ERSD: As of approximately September '11, the ERSD test node is connected at 1 gbps – it was previously 100 mbps. The median thruput from most nodes improved at that time.   Peak thruput from GSFC ENPL is over 500 mbps.

Some nodes, however, (e.g., EDOS) had been using QoS (HTB) to reduce loss previously seen in the 1 gig to 100 meg switch at Tokyo-XP – so it initially remained limited by its HTB settings, and did not see much improvement. **The EDOS HTB settings were raised in February, resulting in much higher average performance,** although it was also very noisy.

Thruput from GES DISC stabilized and improved in mid February, due to the GES DISC firewall replacement.

Thruput remains well above 3 x the reduced requirement, so the rating remains **Excellent** . The user flow was about 25% higher than normal this month, in both directions, and remains consistent with the requirement.

The FastE connected GSFC-ENPL-FE node is limited to 100 mbps by its own interface, and gets very steady thruput.

ERSD → JPL-ASTER-IST: The JPL-ASTER-IST test node was retired in October; a replacement node is being sought. As a substitute, testing was initiated from ERSD to a different node at JPL ("TES"). Results to TES are better than previously to the JPL-ASTER-IST, and would be rated **Excellent .**

ERSD → EROS: The thruput improved with retuning in October '11, after the ERSDAC Gig-E upgrade; it remains well above the reduced requirement (was 26.8 mbps previously). The user flow was near normal this month. The median thruput is more than 3 x the reduced requirement, so the rating remains **Excellent** .

ERSDAC: Thruput

ERSDAC: Thruput

JPL_ASTER_IST: Thruput

JPL_TES: Thruput

EROS: Thruput
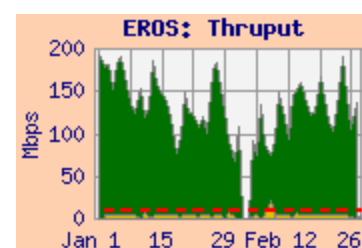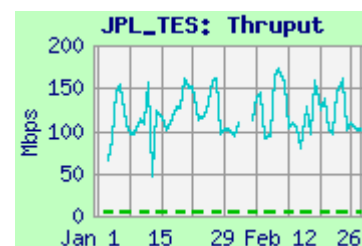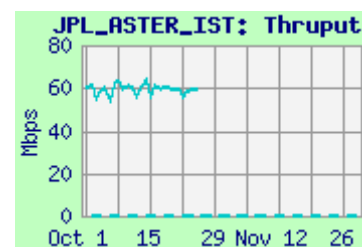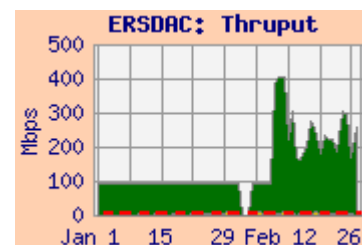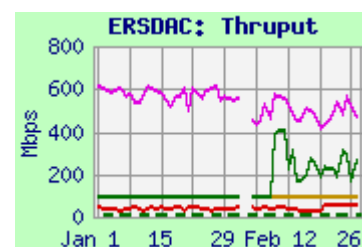
10) US ←→ JAXA

Ratings: US → JAXA: N/A
JAXA → US: N/A

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009 (the end of the Japanese government's fiscal year). No additional testing is planned for AMSR or TRMM. All testing to JAXA-TKSC for ALOS was terminated at the end of June '09. JAXA has been requested to restore these tests – in preparation for GPM -- but they have declined to participate.

However, the user flow between GSFC and JAXA continues to be measured. As shown below, the user flow this month averaged 4.76 mbps from GSFC to JAXA, and 1.51 mbps from JAXA to GSFC.

These values are consistent with the new (database) requirements of 3.36 mbps to JAXA, and 1.31 mbps back to JPL. However, since no iperf tests are run, the true capability of the network cannot be determined, and therefore no rating is assigned. But since the user flow in both directions exceeds the corresponding requirement, the rating would be at least "Adequate"

GSFC To JAXA Daily Average Data Flow
February 2013
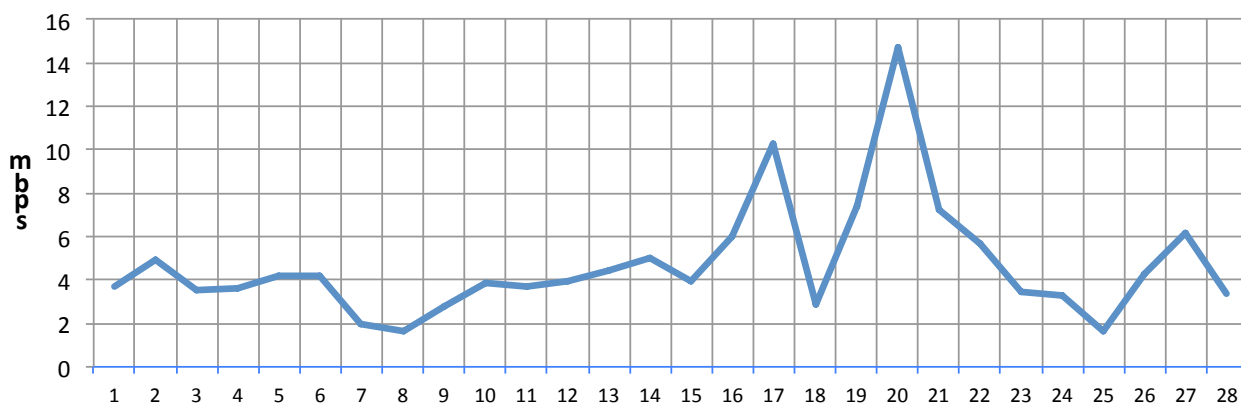
JAXA to GSFC To Daily Average Data Flow
February 2013